

38. (New) A method for stimulating an immune response, comprising administering to a lymphoid tissue *in vivo* a plasmid vector containing a nucleic acid molecule comprising a B cell expression element operationally linked to a nucleic acid sequence encoding one or more heterologous epitopes, wherein said one or more heterologous epitopes are expressed in a B cell.

39. (New) A method for stimulating an immune response, comprising administering to a lymphoid tissue *ex vivo* a plasmid vector nucleic acid molecule comprising a B cell expression element operationally linked to a nucleic acid sequence encoding one or more heterologous epitopes, wherein said one or more heterologous epitopes are expressed in a B cell.

40. (New) A method for stimulating an immune response, comprising targeting a plasmid vector containing a nucleic acid molecule to a B cell *ex vivo* and administering said B cell to an individual, wherein said nucleic acid molecule comprises a B cell expression element operationally linked to a nucleic acid sequence encoding one or more heterologous epitopes, and wherein said one or more heterologous epitopes are expressed in said B cell.

41. (New) A method for stimulating an immune response, comprising administering to a B cell *in vivo* a plasmid vector containing a nucleic acid molecule comprising a B cell expression element operationally linked to a nucleic acid sequence encoding one or more heterologous epitopes, wherein said one or more heterologous epitopes are expressed in said B cell.

42. (New) A method of treating a condition, comprising administering to an individual *in vivo* a plasmid vector containing a nucleic acid molecule comprising a B cell expression element operationally linked to a nucleic acid

Inventor: Maurizio Zanetti
Serial No.: 09/300,959
Filed: April 27, 1999
Page 3

sequence encoding a heterologous polypeptide, wherein said heterologous polypeptide is expressed in a B cell.

43. (New) A method of treating a condition, comprising targeting a plasmid vector containing a nucleic acid molecule to a B cell *ex vivo* and administering said B cell to an individual, wherein said nucleic acid molecule comprises a B cell expression element operationally linked to a nucleic acid sequence encoding one or more heterologous epitopes, and wherein said one or more heterologous epitopes are expressed in said B cell.

44. (New) A plasmid vector containing a nucleic acid molecule comprising a B cell expression element operationally linked to a nucleic acid sequence encoding a heterologous polypeptide antigen, wherein said B cell expression element comprises a B cell promoter and enhancer, wherein said antigen functions as a vaccine.

45. (New) The plasmid vector of claim 44, wherein said nucleic acid sequence encodes a polypeptide antigen expressed as a fusion with a cytokine.

46. (New) The plasmid vector of claim 45, wherein said cytokine is selected from the group consisting of granulocyte-macrophage colony-stimulating factor, interleukin-2, interleukin-4, interferon- γ , interleukin-5, interleukin-6, interleukin-7, interleukin-10, interleukin-12 and interleukin-15.

47. (New) The plasmid vector of claim 46, wherein said cytokine is granulocyte-macrophage colony-stimulating factor.

Inventor: Maurizio Zanetti
Serial No.: 09/300,959
Filed: April 27, 1999
Page 4

48. (New) The plasmid vector of claim 46, wherein said cytokine is interleukin-2.

49. (New) The plasmid vector of claim 46, wherein said cytokine is interleukin-4.

50. (New) The plasmid vector of claim 46, wherein said cytokine is interferon- γ .

51. (New) The plasmid vector of claim 46, wherein said cytokine is interleukin-5.

52. (New) The plasmid vector of claim 46, wherein said cytokine is interleukin-6.

53. (New) The plasmid vector of claim 46, wherein said cytokine is interleukin-7.

54. (New) The plasmid vector of claim 46, wherein said cytokine is interleukin-10.

55. (New) The plasmid vector of claim 46, wherein said cytokine is interleukin-12.

56. (New) The plasmid vector of claim 46, wherein said cytokine is interleukin-15.

57. (New) A plasmid vector containing a nucleic acid molecule comprising a B cell expression element operationally linked to a nucleic acid sequence encoding a heterologous polypeptide fusion with a cytokine, wherein said B cell expression element comprises a B cell promoter and enhancer.

Inventor: Maurizio Zanetti
Serial No.: 09/300,959
Filed: April 27, 1999
Page 5

58. (New) The plasmid vector of claim 55, wherein said cytokine is selected from the group consisting of granulocyte-macrophage colony-stimulating factor, interleukin-2, interleukin-4, interferon- γ , interleukin-5, interleukin-6, interleukin-7, interleukin-10, interleukin-12 and interleukin-15.

59. (New) The plasmid vector of claim 58, wherein said cytokine is granulocyte-macrophage colony-stimulating factor.

60. (New) The plasmid vector of claim 58, wherein said cytokine is interleukin-2.

61. (New) The plasmid vector of claim 58, wherein said cytokine is interleukin-4.

62. (New) The plasmid vector of claim 58, wherein said cytokine is interferon- γ .

63. (New) The plasmid vector of claim 58, wherein said cytokine is interleukin-5.

64. (New) The plasmid vector of claim 58, wherein said cytokine is interleukin-6.

65. (New) The plasmid vector of claim 58, wherein said cytokine is interleukin-7.

66. (New) The plasmid vector of claim 58, wherein said cytokine is interleukin-10.

67. (New) The plasmid vector of claim 58, wherein said cytokine is interleukin-12.